



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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TC 1700

In re Application of:

ANTONIO GIGOLA

Serial No.: 09/482,046

For: PROCEDURE AND PRESS FOR PRODUCING SCREENING AND HUMIDIFYING PANELS IN PARTICULAR FOR AVICULTURAL FACILITIES OR GREENHOUSES AND PANELS PRODUCED BY THIS PROCEDURE

DECLARATION UNDER 37 CFR §1.132

In the matter of the above identified application pending in the U.S. Patent and Trademark Office, the undersigned CASSAGHI, Pietro and MOLINARI, Plinio declare as follows:

1. I, CASSAGHI, Pietro, am a Chemical Engineer for Process Technologies. I act as technical expert for the company TOCCCHIO S.r.l., which is a well-known Italian producer of plants and equipments for impregnating, printing, coating and processing paper and cardboard products. I also act as technical expert for the company CARTIERA GIACOSA S.p.A., which is one of the most important paper manufacturing concerns in Italy.
2. I, MOLINARI, Plinio, am an Engineer, enrolled in the Register of Engineers under No. 1023. I am a technical expert with the Court of Brescia, Italy.
3. We have read the above identified patent application and the patents referred to below and we fully understand the subject-matter thereof.
4. We have evaluated the relevant material of U.S. Patents Nos. 3,963,810, 3,415,502, 4,732,713 and of any other prior art document referred to during the examination procedure of the Gigola patent application.

5. The Gigola patent application concerns a screening and humidifying panel intended to be used in avicultural facilities or greenhouses, as well as a method and a press for producing said panel.

The panel consists of a plurality of cardboard sheets (preferably cardboard impregnated with resins) shaped with undulated channels having non-rectilinear axis, so that the mouths of the channels are not in view of each other along the channel axis. Adjacent sheets are glued together at contacting channel crests and are arranged with alternating different mutual inclination of the channels.

The process for manufacturing this panel comprises the steps of:

- shaping the cardboard sheets with said non-rectilinear undulated channels by sequential pressing of the individual undulated channels starting from one end of each sheet, thereby obtaining said undulated channels with non-rectilinear axis, so that the mouths of the channels are not in view of each other along the channel axis, and
- gluing together the sheets arranged with alternating different mutual inclination of the channels.

The press for manufacturing this panel has a die made up of a plurality of segments, wherein each segment represents at least a part of a longitudinally non-rectilinear channel. These segments move sequentially to press the cardboard sheet starting from one end of the press.

6. It is a common knowledge in the field of paper and cardboard production and manufacturing that, in view of the structure of paper or cardboard being made of single fibers adhering to each other, application of a tensile stress deriving for example from a non-uniform distribution of deformations or from a simultaneous deformation along two or more different directions would not cause an elongation or a deformation of the fibers, but a separation of the fibers from each other with a consequent sudden tearing of the paper or cardboard sheet.

This behaviour of paper and cardboard, indisputably known in the art, is completely different from the behaviour of other materials such as

plastics and metals under the same conditions, which materials have a molecular structure allowing a high degree of deformability (plasticity, ductility, malleability, etc.).

7. The U.S. Patent No. 3,963,810 (Holmberg et al.) refers to a panel to be used in cooling towers and air humidifiers to provide thermal contact between water and an air flow. The panel is made of a plurality of adjacent sheets having undulated channels with rectilinear axis. US 3,963,810 (Holmberg et al.) mentions (column 1, lines 24-26 and column 3, lines 62-64) that this kind of panels are usually made of corrugated plates or foils of metal, plastics or impregnated cardboard. This statement is true and, in the point of view of a person skilled in the art, it does clearly mean that metal, plastics and impregnated cardboard can be indifferently used to produce panels for cooling towers or air humidifiers: in other words, these materials are equivalent for the general purpose of allowing a good exchange between air and water in said facilities.

For certain, there is not any statement in US 3,963,810 (Holmberg et al.) about metal, plastics and impregnated cardboard being equivalent in their physical and mechanical characteristics and, consequently, in their behaviour during the panel manufacturing process. On the other hand, such statement would be fully in contrast with the well-known knowledge of the people skilled in the art of paper and cardboard production and manufacturing (referred to in point 6 above) that paper and cardboard are inextensible and any application of tensile stresses to a paper or cardboard sheet would immediately cause breaking thereof.

Some of the panels disclosed by US 3,963,810 (Holmberg et al.), such as those shown in figures 1, 2 and 3, have undulated channels with rectilinear axis. Of course, these panels can be indifferently made of metal, plastics or impregnated cardboard: deforming cardboard according to this configuration, i.e. with rectilinear folds or waves, would indeed be performed without any risk of tearing the cardboard sheet.

Other panels disclosed by US 3,963,810 (Holmberg et al.), such as that shown in figure 5, have channels with sinusoidal axis. By observing the complex shape and the sharp edges of the folds and of the spacer elements 5, 6 of the panel illustrated in the above mentioned figure 5, a person skilled in the art immediately understands that said panel cannot be made of cardboard, but of drawn metal or, better, of plastics. US 3,963,810 (Holmberg et al.) does indeed suggest that the panel according to the invention described therein should be made of plastic, and preferably of thermoplastic plastic, for example polyvinyl chloride, which can be easily worked to obtain the desired shape (column 3, lines 65-67 and claim 10).

To sum up, US 3,963,810 (Holmberg et al.) merely teaches that a panel with undulated channels can be made of any material suitable to be manufactured for obtaining the desired shape, i.e. indifferently of metal, plastics or impregnated cardboard if only rectilinear deformations are requested and only of metal or plastics if more complex configurations must be obtain, which would involve a non-uniform distribution of deformations or a simultaneous deformation along two or more different directions.

The panel according to Gigola patent application is well different from those disclosed by US 3,963,810 (Holmberg et al.) because the sheets forming the panel are shaped with undulated channels having non-rectilinear axis, so that the mouths of the channels are not in view of each other along the channel axis, even though they are made of cardboard.

Obtaining such panels has been made possible by devising a manufacturing process wherein the cardboard sheets are formed with said non-rectilinear undulated channels by sequential pressing of the individual undulated channels starting from one end of each sheet and gluing together the sheets arranged with alternating different mutual inclination of the channels. This manufacturing process has been made possible by providing a press with a die made up of a plurality of

segments, wherein each segment represents at least a part of a longitudinally non-rectilinear channel and the segments move sequentially to press the cardboard sheet starting from one end of the press.

The above mentioned manufacturing process, performed by such press, allows the cardboard sheets to be actually shaped with non-rectilinear channels, thus introducing a concept extremely innovative in the field of paper and cardboard production and manufacturing.

8. The U.S. Patent No. 3,415,502 (Munters) refers to an exchanger packing for cooling towers, which is made of a plurality of undulated layers. Some of the panels disclosed by US 3,415,502 (Munters), for example that shown in figure 7, have non-rectilinear (zig-zag) channels. However, as clearly mentioned throughout the whole description of US 3,415,502 (Munters), all of the panels disclosed therein are made of synthetic plastic material, such as polyvinyl chloride. No mention is made in US 3,415,502 (Munters) on the possibility of making said panels of cardboard, in compliance with the common knowledge (referred to in point 6 above) that paper and cardboard are inextensible and any application of tensile stresses to a paper or cardboard sheet would immediately cause breaking thereof.

To sum up, US 3,415,502 (Munters) merely teaches that if a panel is to be produced with sheets characterized by non-rectilinear undulated channels, it must be made of plastic materials and, therefore, a person skilled in the art desiring to produce a panel with cardboard sheets having non-rectilinear undulated channels would not get any useful teachings from US 3,415,502 (Munters).

9. The U.S. Patent No. 4,732,713 (Korsell) refers to a panel for heat exchangers or cooling towers, which is made of plastic material, irrespective of the shape of the channels formed on the sheets. Therefore, no useful teachings can be taken from US 4,732,713 (Korsell) in order to manufacture a panel with cardboard sheets having non-rectilinear undulated channels.

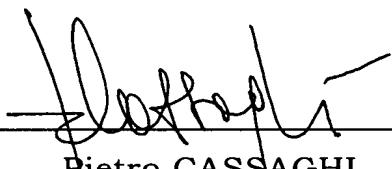
10. In our opinion none of the above cited patents, neither taken alone nor combined together, suggests to a person skilled in the art that a screening and humidifying panel consisting of a plurality of sheets shaped with undulated channels could be made of impregnated cardboard even if the undulated channels are designed to have non-rectilinear axis, so that the mouths of the channels are not in view of each other along the channel axis, as claimed in the Gigola patent application.

At the most, following the teachings of said patents, one could have chosen to use cardboard instead of plastics, but in case of using cardboard he would have been induced to make the channels rectilinear according to the common knowledge that paper and cardboard are inextensible and, therefore, any application of tensile stresses to a paper or cardboard sheet would immediately cause breaking thereof.

Moreover, no suggestions can be found in said patents either about a manufacturing process wherein the cardboard sheets are formed with said non-rectilinear undulated channels by sequential pressing of the individual undulated channels starting from one end of each sheet and then gluing together the sheets arranged with alternating different mutual inclination of the channels, or about a press suitable to carry out said process, with a die made up of a plurality of segments, wherein each segment represents at least a part of a longitudinally non-rectilinear channel and the segments move sequentially to press the cardboard sheet starting from one end of the press, as claimed in the Gigola patent application.

11. We further declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false

statements may jeopardize the validity of the above application, any patent issued thereon, or any patent to which this Declaration is directed.

Signed: 

Printed Name: Pietro CASSAGHI

Title: Chemical Engineer

Signed: 

Printed Name: Plinio MOLINARI

Title: Engineer, Court Technical Expert

Date: 4 DIC. 2003